

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An index head ~~in assembly for~~ a semiconductor device test handler, for holding semiconductor devices, and mounting/dismounting to/from test sockets comprising:

a carrier base ~~fixedly fitted~~ configured to be fixed to a transfer device ~~movable in any direction of the handler;~~

an elevating carrier movably coupled to the carrier base ~~to be movable in up and down directions~~ and configured to be raised and lowered relative to the carrier base;

~~an elevating means for moving device~~ configured to raise and to lower the elevating carrier ~~in up and down directions with respect~~ relative to the carrier base;

a head holder ~~under the elevating carrier~~ movably coupled to a lower portion of the elevating carrier via ~~a~~ at least one guide member ~~for making relative movement with respect~~ and configured to move in a vertical direction relative to the elevating carrier ~~in up and down directions;~~ and;

a plurality of heads ~~each including;~~ fixed to the head holder, wherein each of the plurality of heads comprises:

a holding part ~~fixedly fitted to a bottom of the head holder for holding the~~
configured to hold a semiconductor device by vacuum, with a vacuum force;

a heating part ~~on top~~ positioned on an upper portion of the holding part ~~for and~~
configured to generate and to transfer of a heat directly to the semiconductor device ~~directly~~
when the semiconductor device is mounted in ~~the a test socket, of the handler;~~ and

a compliance part ~~fitted over~~ positioned on an upper portion of the heating part
~~for providing degrees of freedom for an alignment between and configured to properly align the~~
semiconductor device held by the holding part and the test socket.

2. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 1, further
comprising a force transducer positioned between the elevating carrier and the head holder ~~for~~
~~automatic measurement of and configured to measure a load applied by the elevating carrier in~~
~~proportion to~~ based on a displacement of the elevating carrier with respect to the head holder
when the semiconductor device mounted in the test socket is pressed down.

3. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 2, wherein
the force transducer ~~is~~ comprises a load cell.

4. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 1, wherein the at least one guide member ~~are~~ member comprises guide pins positioned on opposite side parts of a top part end portions of an upper portion of the head holder for being and configured to be inserted, and coupled to into corresponding holes in the elevating carrier so as to allow the head holder be movable in ~~up and down directions~~ a vertical direction relative to the elevating carrier.

5. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 1, wherein the at least one guide member ~~includes one~~ comprises a pair of linear motion (LM) guides fitted to the elevating carrier in ~~up and down directions~~ so as to be oriented in a vertical direction, and a corresponding pair of LM blocks fixed to a rear surface of the head holder and coupled to the pair of LM guides.

6. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 1, wherein the compliance part ~~in the head includes;~~ comprises:

an upper block ~~fixedly fitted~~ fixed to the head holder ~~having and comprising~~ a plurality of holes formed in a bottom surface lower portion thereof[[,]];

a plurality of ball plungers each ~~having comprising~~ an elastic body inserted, and retained in the configured to be inserted into and retained in a corresponding hole of the

plurality of holes formed in the upper block, a retainer coupled to a lower end of the elastic body, and a ball configured to be retained under the retainer and such that a portion of the ball is exposed outside of the at a bottom surface of the upper block[[,]];:

a lower block configured to be coupled to a bottom part portion of the upper block with a preset allowance[[,]] therebetween; and

~~ball buttons~~ a plurality of recesses formed in an upper surface of the lower block at positions in ~~correspondence~~ corresponding to the holes formed in the upper block ~~for receiving and holding, wherein the plurality of recesses are configured to receive and to hold the balls of the plurality of ball plungers.~~

7. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 1, wherein the heating part ~~includes~~; comprises:

a heating block formed of a conductive material ~~having a built-in electric and comprising a heater for generating, and configured to generate and to transfer of a heat to the holding part under the heating block;~~

a through hole formed in a central part portion of the heating block[[,]]; and

a coupling nozzle ~~passed through~~; coupled to the compliance part with a space formed therebetween, wherein the coupling nozzle is configured to be inserted into and fixed to

~~in the through hole for evacuation of air so as to form a vacuum therein, and is coupled with the compliance part with a spaced away therefrom.~~

8. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 7, wherein a lower end of the coupling nozzle is ~~formed of an elastic material for having flexibility~~ configured to be flexible.

9. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 8, wherein a lower end of the coupling nozzle is formed of ~~silicone~~ an elastic material.

10. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 1, wherein the holding part ~~for holding the semiconductor device includes; comprises:~~
a pocket block formed of a conductive material ~~for close~~ and configured to closely
~~contact coupling with a bottom lower surface of the heating block in the heating part~~[[,]];
a through hole formed in a center ~~part~~ portion of the pocket block[[,]];
a floating nozzle configured to be inserted in, and into and coupled to the through
hole, and to be connected to the ~~coupling nozzle in the heating part for adsorbing and holding~~
so as to absorb and to hold the semiconductor device ~~by with a vacuum, and force; and~~

a plurality of blades formed of a non-conductive material and positioned so as to be oriented in a vertical direction relative to a bottom surface of the pocket block for pressing, wherein the plurality of blades are configured to press on leads of the semiconductor device held by the floating nozzle so as to bring the leads into contact with a terminal part of the test socket.

11. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 7, wherein the holding part ~~for holding the semiconductor device includes;~~ comprises:

a pocket block formed of a conductive material ~~for close contact coupling with~~ and configured to closely contact a bottom surface of the heating block ~~in the heating part;~~

a through hole formed in a center ~~part~~ portion of the pocket block[[,]];

a floating nozzle configured to be inserted ~~in;~~ into and coupled to the through hole, and to be connected to the coupling nozzle in the heating part for adsorbing and holding so as to absorb and to hold the semiconductor device ~~by with a vacuum, and force; and~~

a plurality of blades formed of a non-conductive material and positioned vertical to a bottom surface of the pocket block ~~for pressing,~~ wherein the plurality of blades are configured to press on leads of the semiconductor device held by the floating nozzle so as to bring the leads into contact with a terminal part of the test socket.

12. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 10, wherein the floating nozzle is configured to be movably coupled to the through hole so as to allow a free vertical movement ~~in up and down directions for~~ of the floating nozzle through a preset distance.

13. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 12, wherein the through hole ~~in the pocket block has~~ comprises steps formed at an upper part and a lower part of the through hole ~~respectively to have~~ each with diameters greater than an intermediate part ~~thereof~~ of the through hole, and wherein the floating nozzle ~~has~~ comprises rims ~~extended~~ extending outward from an upper part and a lower part of the floating nozzle ~~for limiting and configured to engage with the steps so as to limit vertical~~ movement of the floating nozzle by the upper and lower steps ~~when the floating nozzle moves in up and down directions in the through hole.~~

14. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 1, further comprising ~~positioning pins in the vicinity of the test socket, and~~ a plurality of positioning holes formed in the holding part ~~for inserting of the head and configured to receive the~~ a plurality of positioning pins positioned proximate the test socket, ~~for accurate guide of the head onto the test socket when the head holds the semiconductor device and mounts in the test socket.~~

15. (Currently Amended) ~~An~~ The index head assembly as claimed in claim 1, wherein the elevating ~~means includes;~~ device comprises:

~~an LM~~ a linear motion (LM) guide fitted-fixed to the carrier base[[,]];

~~an a~~ LM block fitted-fixed to the elevating carrier and coupled to the LM guide[[,]];

a ball screw ~~fitted~~ fixed to the carrier base and coupled to the elevating carrier[[,]];

and

~~an electric~~ a motor for rotating configured to drive the ball screw.

16. (New) The index head assembly as claimed in claim 1, wherein the compliance part is configured to provide a plurality of degrees of freedom to the plurality of heads so as to properly align the semiconductor device in the test socket.

17. (New) The index head assembly as claimed in claim 7, wherein the heater comprises an electric heater.

18. (New) The index head assembly as claimed in claim 9, wherein a lower end of the coupling nozzle is formed of silicone.

19. (New) The index head assembly as claimed in claim 10, wherein the heating part comprises a heating block, and wherein the pocket block is configured to closely contact a bottom surface of the heating block.

20. (New) The index head assembly as claimed in claim 10, wherein the heating part comprises a coupling nozzle, and wherein the floating nozzle is configured to be coupled to the coupling nozzle.

21. (New) The index head assembly as claimed in claim 14, wherein the plurality of positioning holes are configured to mate with the plurality of positioning pins to accurately guide a head of the plurality of heads onto a corresponding test socket of the handler.

22. (New) An index head assembly for a semiconductor device handler, comprising:
a carrier base fixed to a transfer device of the handler;
an elevating carrier movably coupled to the carrier base;
an elevating device configured to move the elevating carrier;
a head holder movably coupled to a lower portion of the elevating carrier and configured to move relative to the elevating carrier; and
a plurality of heads fixed to the head holder, wherein each of the plurality of heads

comprises:

a holding part configured to hold a semiconductor device;

a heating part coupled to an upper portion of the holding part and configured to generate and to transfer heat to a semiconductor device when it is held by the holding part and mounted in a test socket of the handler; and

a compliance part coupled to an upper portion of the heating part and configured to adjust a position of a semiconductor device when it is held by the holding part and mounted in the test socket.

23. (New) The index head assembly as claimed in claim 22, wherein the compliance part is configured to adjust a tilt of the semiconductor device when it is held by the holding part and mounted in the test socket.

24. (New) The index head assembly as claimed in claim 22, wherein the compliance part is configured to adjust an offset of the semiconductor device when it is held by the holding part and mounted in the test socket.

25. (New) The index head assembly as claimed in claim 22, wherein the compliance part is configured to adjust a rotation of the semiconductor device when it is held by the holding part and mounted in the test socket.

26. (New) The index head assembly as claimed in claim 22, wherein the elevating device is configured to move the elevating carrier in a vertical direction relative to the carrier base.

27. (New) The index head assembly as claimed in claim 22, wherein the head holder is configured to move in a vertical direction relative to the elevating carrier.

28. (New) The index head assembly as claimed in claim 22, wherein the heating part is configured to transfer heat directly to a semiconductor device when it is held by the holding part and mounted in a test socket of the handler.

29. (New) The index head assembly as claimed in claim 22, further comprising a force transducer positioned between the elevating carrier and the head holder and configured to measure a load applied by the elevating carrier.

30. (New) The index head assembly as claimed in claim 29, wherein the load applied by the elevating carrier is based on a displacement of the elevating carrier relative to the head holder when a semiconductor device is mounted in the test socket and pressed down.

31. (New) The index head assembly as claimed in claim 30, wherein the force transducer comprises a load cell.

32. (New) The index head assembly as claimed in claim 22, wherein the compliance part comprises:

- an upper block fixed to the head holder;

- a lower block coupled to the upper block;

- a plurality of ball plungers each comprising an elastic body configured to be inserted into and retained in a corresponding hole formed in the upper block, a retainer coupled to a lower end of the elastic body, and a ball configured to be retained under the retainer such that a portion of the ball is exposed at a bottom surface of the upper block;

- a plurality of recesses formed in an upper surface of the lower block corresponding to a plurality of holes formed in a lower surface of the upper block, wherein the plurality of recesses are configured to receive and to hold the balls of the plurality of ball plungers.

33. (New) The index head assembly as claimed in claim 32, wherein the heating part comprises:

a heating block comprising a heater configured to generate and to transfer heat to the holding part;

a first through hole formed in a central portion of the heating block; and

a coupling nozzle coupled to the compliance part, wherein the coupling nozzle is configured to be inserted into and fixed in the first through hole so as to form a vacuum therein.

34. (New) The index head assembly as claimed in claim 33, further comprising a space formed between the coupling nozzle and the compliance part.

35. (New) The index head assembly as claimed in claim 33, wherein the holding part comprises:

a pocket block configured to contact a lower surface of the heating block;

a second through hole formed in a center portion of the pocket block;

a floating nozzle configured to be inserted into and coupled to the second through hole, and to be connected to the coupling nozzle so as to absorb and to hold a semiconductor device; and

a plurality of blades positioned so as to be oriented in a vertical direction relative

to a bottom surface of the pocket block and configured to press on leads of the semiconductor device so as to bring the leads into contact with a terminal part of the test socket.

36. (New) The index head assembly as claimed in claim 35, wherein the heating block is formed of a conductive material, and wherein the plurality of blades are formed of a non-conductive material.

37. (New) The index head assembly as claimed in claim 35, wherein the floating nozzle is configured to be movably coupled to the second through hole so as to allow vertical movement of the floating nozzle through a preset distance.

38. (New) The index head assembly as claimed in claim 35, wherein the second through hole comprises steps formed at an upper portion and a lower portion thereof, each with a diameter greater than an intermediate portion of the second through hole, and wherein the floating nozzle comprises rims extending outward from an upper portion and a lower portion thereof configured to engage with the steps formed in the second through hole so as to limit a vertical movement of the floating nozzle.